

## REMARKS

Reconsideration of the present application is respectfully requested.

Claims 1-20 stand rejected under 35 U.S.C. § 103(a) over Vogtlin et al. and Kharas and Narula et al. Applicants respectfully disagree, but several of the rejections remain unclear. For instance, it appears that Kharas was not relied upon in the rejection of claim 1, the rejections of claims 3 and 11 are unclear since they merely refer to respective Figures 4 and 2, but there is no mention of which reference these figures belong to, and the specific limitations of claim 16 are not discussed. Therefore, initially Applicants respectfully request that these rejections be clarified or withdrawn.

It is apparently undisputed that there is no explicit, implicit, or inherent teachings in the cited references to support the combination as relied upon in the outstanding rejections. Instead, one with ordinary skill in the art would apparently be motivated to combine the teachings of the cited references based upon the unsupported assertion that "greater pore volume translates into greater catalytic loading". Not only is this assertion unsupported by any evidence of record, but Applicants respectfully assert that it is flawed. Those with ordinary skill in the art may, or may not, know that a greater pore volume does not always result in greater metal loading. Those with ordinary skill in the art may recognize that metal loading is a function of the available surface area on the support material. But greater pore volume does not inherently mean greater surface area. In fact, Applicants' Table II shows that greater pore volume does not always result in greater surface area. Furthermore, greater metal loading does not always increase the catalytic activity of the metal-doped Y-alumina. For instance, Figure 6 and 7 of the present application illustrate that the maximum activity for indium-doped y-alumina occurred at 2.5% weight indium rather than at one of the higher percentages tested. Thus, because the grounds put forth in the Office Action to support combining the references to reject Applicants' claims is unsupported by any evidence of record, and is in fact flawed, Applicants respectfully request that all of the outstanding §103(a) rejections be withdrawn.

Even if Narula could be fairly combined with Vogtlin, Narula would have to be modified against its own teachings in order to arrive at Applicants' claimed invention. Such a modification is forbidden by the MPEP and relevant case law. There should be no dispute that Narula explicitly teaches an alumina support with relatively small pore volumes that are substantially less than Applicants' claimed pore

volumes of at least 1.0 cubic centimeters/gram. In fact, at column 3, lines 3-5, Narula teaches that the pore size should be controlled in order to create inorganic membranes that mimic the effectiveness of a zeolite pore structure. Narula recognizes at column 2, lines 5-10 that zeolites have fine pore sizes that are well outside Applicants' claimed range. Thus, one with ordinary skill in the art would be motivated by the Narula teachings to produce pore sizes in an alumina support material on the order of 20-60 angstroms. But again, that is not what Applicants have claimed.

Although pore volume and pore size are two different characteristics of a support material, it has been found that an alumina support material with relatively fine pore sizes as per Narula can not also include the relatively large pore volumes required by Applicants' claims. It is important to note that in Applicants Table II not one of the alumina supports 6, 8, 15 or 17 includes pore sizes between 20-60 angstroms, as per Narula, and also produced a pore volume greater than 1.0 cubic centimeters/gram. Thus, there should be no dispute that in order to modify Narula to arrive at Applicants claimed pore volumes of 1.0 cubic centimeters/gram, Narula would have to be modified against its own teachings. In other words, Narula teaches relatively small pore sizes, which are incompatible with Applicants' claimed pore volumes of greater than 1.0 cubic centimeters/gram. Thus, because Narula would have to be modified against its own teachings in order to arrive at Applicants' claimed invention, Applicants again respectfully request that the outstanding §103 rejections be withdrawn.

Even if there existed a well reasoned motivation to combine the cited references to supposedly arrive at Applicants' claimed invention, and such a combination could be made without modifying any of the cited references against their own teachings, the combination of the cited references does not teach the subject matter of Applicants' claims. There should be no dispute that the early hydrolyzation sol gel process taught by Narula is incompatible with making Y-alumina with pore volumes having at least 1.0 cubic centimeters per gram and per Applicants' claims. Thus, even if one could fairly assert that Narula teaches that pore volumes can be customized using a sol gel process, the sol gel process with early hydrolyzation taught by Narula inherently results in smaller pore volumes that are far smaller than what Applicants have claimed. For example, sample 6 in Applicants Table II is a product made by a sol gel process similar to Narula, but that sample resulted in a pore volume significantly less than 1 cubic centimeter per gram. Because Narula teaches a sol gel process for customizing relatively small pore sizes

that are incompatible with Applicants' claimed pore volumes, Applicants again respectfully request that all of the outstanding §103 rejections be withdrawn.

Claim 4 has been amended to make it clear that not only is the  $\gamma$ -alumina doped with one of the identified metals, but the  $\gamma$ -alumina has a surface area of at least 200 square meters per gram. This claim should be allowable over and above the reasons set forth with regard to claim 1.

Claim 10 has also been amended to make it clear that Applicants' claimed sol gel method is accomplished with at least one of a complexing agent and a propanol wash. There should be no dispute that the early hydrolyzation sol gel method taught by Narula is something other than that required by Applicants' claim 10.

Applicants have also amended claim 17 to better correspond to the claimed subject matter. In particular, claim 17 requires that the  $\gamma$ -alumina be sulfate free. Applicants respectfully request that this claim be shown as allowable over and above its base claim 12.

In view of the amending changes made, this application is believed to be in condition for allowance of claims 1-20. However, if the Examiner believes that some minor additional clarification would put this application in even better condition for allowance, the Examiner is invited to contact the undersigned attorney at (812) 333-5355 in order to hasten the prosecution of this application.

Applicants also request that the Examiner initialize and sign the IDS form page 2 of 2 (copy attached) that accompanied the original Application.

Respectfully Submitted,

A handwritten signature in black ink, appearing to read 'MBM', is written over the printed name.

Michael B. McNeil  
Reg. No. 35,949

Please type a plus sign (+) inside this box



Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

PTO/SB/08B (10-96)  
Approved for use through 10/31/99. OMB 0651-0031  
Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE

Substitute for form 1449B/PTO

Complete if Known

# INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(use as many sheets as necessary)

Sheet

2

of

2

Application Number

09/708,863

Filing Date

1/8/2000

First Named Inventor

Christopher L. Aardahl ET AL.

Group Art Unit

3748

Examiner Name

Attorney Docket Number

00-508

## OTHER PRIOR ART - NON PATENT LITERATURE DOCUMENTS

Examiner Initials*	Cite No. <sup>1</sup>	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T <sup>2</sup>
		"Promotive Effect of Sn on the Catalytic Activity of Al <sub>2</sub> O <sub>3</sub> for the Selective Reduction of NO by Methanol", Tabata et al., Catalysis Letters 25 (1994), pgs. 55-60, J. C. Baltzer AG, Science Publishers	
		"Ga <sub>2</sub> O <sub>3</sub> /Al <sub>2</sub> O <sub>3</sub> Prepared by Sol-Gel Method as a Highly Active Metal Oxide-Based Catalyst for NO Reduction by Propene in the Presence of Oxygen, H <sub>2</sub> O and SO <sub>2</sub> ", Haneda et al., Chemistry Letters 1998, pgs. 181-182, Chemistry Letters 1998, The Chemical Society of Japan, 1998	
		"Lean NO <sub>x</sub> Catalysis over Sn/γ-Al <sub>2</sub> O <sub>3</sub> Catalysts", Kung et al., Journal of Catalysis 181, 1999, pgs 1-5, Academic Press, 1999	
		"Influence of local structure on the catalytic activity of gallium oxide for the selective reduction of NO by CH <sub>4</sub> ", Shimizu et al., pgs. 1827-1828, Chem. Commun., 1996	
		"Activity enhancement of SnO <sub>2</sub> -doped Ga <sub>2</sub> O <sub>3</sub> -Al <sub>2</sub> O <sub>3</sub> catalysts by coexisting H <sub>2</sub> O for the selective reduction of NO with propene", Haneda et al., Applied Catalysis B: Environmental 20 1999, pgs. 289-300, Elsevier Science B.V. 1999	
		"Selective Reduction of Nitrogen Monoxide with Hydrocarbons over SnO <sub>2</sub> Catalyst", Teraoka et al., Chemistry Letters 1993, pgs 773-776, The Chemical Society of Japan, 1993	
		"Alumina-supported Catalysts for the Selective Reduction of Nitric Oxide by Propene", Miyadera et al., Chemistry Letters 1993, pgs 1483-1486, The Chemical Society of Japan 1993	
		"Characterization of SnO <sub>2</sub> /Al <sub>2</sub> O <sub>3</sub> Lean NO <sub>x</sub> Catalysts", Park et al., Journal of Catalysis 184, 1999, pgs 440-454, Academic Press 1999	
		"Enhanced activity of In and Ga-supported sol-gel alumina catalysts for NO reduction by hydrocarbons in lean conditions", Applied Catalysis B: Environmental 15 1998, pgs 291-304, Elsevier Science B.V. 1998	
		"Plasma-Enhanced Catalytic Reduction of NO <sub>x</sub> in Simulated Lean Exhaust", Aardahl et al., Society of Automotive Engineers, Inc. 2000	

Examiner  
Signature

Date  
Considered

\*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

<sup>1</sup> Unique citation designation number. <sup>2</sup> Applicant is to place a check mark here if English language Translation is attached.

Burden Hour Statement: This form is estimated to take 2.0 hours to complete. Time will vary depending upon the needs of the individual case. Any comments on the amount of time you are required to complete this form should be sent to the Chief Information Officer, Patent and Trademark Office, Washington, DC 20231. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Assistant Commissioner for Patents, Washington, DC 20231.